

# PERRY'S CHEMICAL ENGINEERS' HANDBOOK SIXTH EDITION

**McGraw-Hill Book Company**

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**Library of Congress Cataloging in Publication Data**

Main entry under title:

**Perry's Chemical engineers' handbook.**

(McGraw-Hill chemical engineering series)

Rev. ed. of: Chemical engineers' handbook. 5th ed.  
1973.

Includes bibliographical references and index.

I. Chemical engineering—Handbooks, manuals, etc.  
I. Perry, Robert H., 1924–1978. II. Green, Don W.  
III. Maloney, James O. IV. Chemical engineers' handbook.  
V. Series.

TP151.P45 1984 660.2'8 84-837

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567890 DOW/DOW 898

ISBN 0-07-049479-7

The editors for this book were Harold B. Crawford and Beatrice E. Eckes, the designer was Mark E. Safran, and the production supervisor was Teresa M. Lenden. It was set in Caledonia by University Graphics, Inc.

Printed and bound by R. R. Donnelley & Sons Company.

TABLE 21-6 U.S. Sieve Series and Tyler Equivalents (ASTM—E-11-61)

Sieve designation	Sieve opening		Nominal wire diam.		Tyler equivalent designation
	Standard	Alternate	mm.	in. (approx. equivalent)	
107.6 mm.	4.24 in.	107.6	4.24	6.40	0.250 in.
101.6 mm.	4 in.	101.6	4.00	6.30	.2480
90.5 mm.	3.54 in.	90.5	3.50	6.18	.2440
76.1 mm.	3 in.	76.1	3.00	5.80	.2283
64.0 mm.	2.54 in.	64.0	2.50	5.30	.2165
53.8 mm.	2.12 in.	53.8	2.12	5.15	.2028
50.8 mm.	2 in.	50.8	2.00	5.05	.1988
45.3 mm.	1.84 in.	45.3	1.75	4.85	.1909
36.1 mm.	1.54 in.	36.1	1.50	4.59	.1807
32.0 mm.	1.54 in.	32.0	1.25	4.25	.1665
25.4 mm.	1.06 in.	25.4	1.06	3.90	.1535
25.4 mm.	1 in.	25.4	1.00	3.80	.1496
22.6 mm.	.76 in.	22.6	0.875	3.50	.1378
19.0 mm.	.76 in.	19.0	.750	3.30	.1289
16.0 mm.	.54 in.	16.0	.625	3.00	.1181
15.5 mm.	0.530 in.	15.5	.590	2.75	.1083
12.7 mm.	.54 in.	12.7	.500	2.67	.1051
11.2 mm.	.54 in.	11.2	.438	2.45	.0965
9.51 mm.	.54 in.	9.51	.375	2.27	.0894
8.00 mm.	.54 in.	8.00	.312	2.07	.0815
6.75 mm.	0.265 in.	6.75	.265	1.87	.0736
6.35 mm.	.54 in.	6.35	.250	1.82	.0717
5.66 mm.	No. 3	5.66	.233	1.68	.0661
4.76 mm.	No. 4	4.76	.187	1.54	.0606
4.00 mm.	No. 5	4.00	.157	1.37	.0539
3.36 mm.	No. 6	3.36	.132	1.23	.0484
2.83 mm.	No. 7	2.83	.110	1.06	.0430
2.38 mm.	No. 8	2.38	.0937	1.00	.0394
2.00 mm.	No. 10	2.00	.0787	0.900	.0354
1.68 mm.	No. 12	1.68	.064	.810	.0319
1.41 mm.	No. 14	1.41	.0555	.725	.0285
1.19 mm.	No. 16	1.19	.0469	.650	.0256
1.00 mm.	No. 18	1.00	.0394	.580	.0228
.841 micron.	No. 20	.841	.0331	.510	.0201
.707 micron.	No. 25	.707	.0278	.450	.0177
.595 micron.	No. 30	.595	.0234	.390	.0154
.500 micron.	No. 35	.500	.0197	.340	.0134
.420 micron.	No. 40	.420	.0165	.290	.0114
.354 micron.	No. 45	.354	.0139	.247	.0097
.297 micron.	No. 50	.297	.0117	.215	.0085
.250 micron.	No. 60	.250	.0098	.180	.0071
.210 micron.	No. 70	.210	.0083	.152	.0060
.177 micron.	No. 80	.177	.0070	.131	.0052
.149 micron.	No. 100	.149	.0059	.110	.0043
.125 micron.	No. 120	.125	.0049	.091	.0036
.105 micron.	No. 140	.105	.0041	.076	.0030
.88 micron.	No. 170	.088	.0035	.064	.0025
.74 micron.	No. 200	.074	.0029	.053	.0021
.63 micron.	No. 230	.063	.0025	.044	.0017
.53 micron.	No. 270	.053	.0021	.037	.0015
.44 micron.	No. 325	.044	.0017	.030	.0012
.37 micron.	No. 400	.037	.0015	.025	.0010

\*These sieves correspond to those proposed as an international (I.S.O.) standard. It is recommended that wherever possible these sieves be included in all sieve analysis data or reports intended for international publication.

†These sieves are not in the fourth-root-of-2 series, but they have been included because they are in common usage.

Screening machines actuated by rotating unbalanced weights have a symmetrical shaft through the screen body with an unbalanced flywheel on each end. Counterweights on each flywheel, which may be moved in relation to the shaft, permit adjustment of the amplitude of vibration. On some makes of machines the complete shaft assembly is contained in a unit bolted to the top of the screen body.

The horizontal-type screen is actuated by an enclosed mechanism consisting of off-center weights geared together on short horizontal shafts. The mechanism is usually mounted between the side plates and above the screen body (Fig. 21-11).

**Electrically Vibrated Screens** These screens are particularly useful in the chemical industry. They handle very successfully many light, fine, dry materials and metal powders from approximately 4

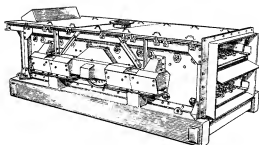


FIG. 21-10 Ty-Rock screen with air-seal enclosure. (W. S. Tyler, Inc.)

mesh to as fine as 325 mesh. Most of these screens have an intense, high-speed (25 to 120 vibrations/s) low-amplitude vibration supplied by means of an electromagnet.

Typical of these is the Hum-mer screen used throughout the chemical industry. Figure 21-12 shows one used throughout the fertilizer industry for handling mixed chemical fertilizers.

**Oscillating Screens** These screens are characterized by low-speed oscillations [5 to 7 oscillations per second (300 to 400 r/min)] in a plane essentially parallel to the screen cloth.

Screens in this group are usually used from 0.013 m ( $\frac{1}{2}$  in) to 60 mesh. Some light free-flowing materials, however, can be separated at 200 to 300 mesh. Silk cloths are often used.

**Reciprocating Screens** These screens have many applications in chemical work. An eccentric under the screen supplies oscillation, ranging from gyratory [about 0.05-m (2-in) diameter] at the feed end to reciprocating motion at the discharge end. Frequency is 8 to 10 oscillations per second (500 to 600 r/min), and since the screen is inclined about 5°, a secondary high-amplitude normal vibration of about 0.0025 m ( $\frac{1}{4}$  in) is also set up. Further vibration is caused by balls bouncing against the lower surface of the screen cloth.

These screens are used extensively in the United States and are standard equipment in many chemical and processing plants for handling fine separations even down to 300 mesh. They are used to handle a variety of chemicals, usually dry, light, or bulky materials, light metal powders, powdered foods, and granular materials. They are not designed for handling heavy tonnage of materials like rock or gravel. Machines of this type are exemplified by Fig. 21-13.

**Gyratory Screens** These are boxlike machines, either round or square, with a series of screen cloths nested atop one another. Oscillation, supplied by eccentrics or counterweights, is in a circular or near-circular orbit. In some machines a supplementary whipping action is set up. Most gyratory screens have an auxiliary vibration caused by balls bouncing against the lower surface of the screen cloth. A typical machine is shown in Fig. 21-14. Machines of this type are operated continuously and can be located in line in pneumatic

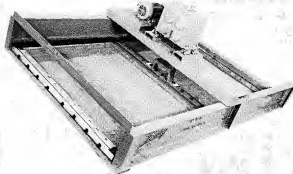


FIG. 21-11 Mechanically vibrated horizontal screen. (Courtesy of Dester Concentrator Company, Inc.)